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# An Attainable Version of High Literacy: Approaches to Teaching Higher-Order Skills in Reading and Writing [1]

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# An Attainable Version of High Literacy: Approaches to Teaching Higher-Order Skills in Reading and Writing

One way of criticizing contemporary literacy education is to credit it with trying to do the right things but to argue that the means could stand improvement. With great variation in the amount and kind of improvement recommended, this seems to be the line of criticism taken by almost everyone from alarmist critics (e.g., Cooperman, 1978; Flesch, 1981) to blue-ribbon panelists (e.g., Anderson, Hiebert, Scott, & Wilkinson, 1985; National Commission on Excellence in Education, 1983). A quite different line of criticism, however, attacks the aim of contemporary literacy education, charging it with being oriented toward the development of a low form of literacy. In their historical analysis of literacy instruction, Resnick and Resnick (1977) identify high literacy and low literacy as distinct educational traditions. High literacy has been a tradition in education of the elites in Europe and America. It has been aimed at developing the linguistic and verbal reasoning abilities, the literary standards and sophistication, and the moral values and precepts appropriate to leaders of society. Mass education, however, according to Resnick and Resnick, grew out of a "low literacy" tradition of efforts to promote the minimum levels of reading needed for religious practice. In this paper we shall not consider the merits of the high literacy tradition as it has actually unfolded. Rather, our concern is with what would be required in order to make high literacy of some sort attainable by the majority of students. The answer, we believe, does not lie in trying to make the common school into a copy of the elite academy. Rather, it lies in constructing new models of curriculum and instruction that can bring the benefits of high literacy to students who do not already come from highly literate backgrounds.

## Models of Teaching in Comprehension and Composition

Many current issues related to understanding and teaching higher-order skills in language arts can be brought out by contrasting three idealized elementary school teachers:

Teacher A typically assigns reading selections with little preparation and then has students answer oral or workbook questions about them. Teacher A then goes through the selection with the class, asking more questions and explaining what it says for the benefit of those who have not understood it. Writing assignments are also given with little preparation. When they are handed in, Teacher A grades them on the basis of content and language and makes suggestions as to how they could be improved. Usually, however, there is no further revision of the papers.

Teacher B is careful to select and sequence reading material so it builds gradually on students' existing knowledge. Before students read a selection, Teacher B carries out activities designed to activate relevant knowledge that students already have available. This might be done by class discussion of the topic, by having students write a story on the topic, or by having students make predictions about the selection to be read. Unfamiliar concepts and terms appearing in the selection are pre-taught. Students may be alerted to special points to be on the watch for, questions to seek answers for, or difficulties to be prepared for. After the selection has been read, Teacher B guides discussion with questions that lead students to draw inferences from what they have read and to relate what they have read to their other knowledge. In writing, Teacher B emphasizes students' writing about what they know best. If a topic is to be assigned, the class will often spend a week before writing begins, reading, discussing, drawing, acting, taking trips--any of a variety of activities to insure ample and available information to draw on in writing. Most often, however, students select their own topics, Teacher B conferring with them individually to help them focus on a

topic in which they have genuine interest, and to formulate goals and plans. Teacher B usually does this through Socratic dialogue, in which students are questioned about their interests, experiences, intentions, and so on. Similar conferences are conducted after the first draft has been written, so as to help the student produce a richer second draft.

Teacher C's approach can best be described as taking all the things that Teacher B does and trying to teach students to do them by themselves. This is not accomplished all at once, of course; and so much of Teacher C's behavior resembles that of Teacher B. But Teacher C's goal is that eventually it should not be necessary to conduct activities for activating students' prior knowledge, to ask them questions in order to relate new knowledge to old, and so on. Students should be doing that by themselves and on their own initiative. Teacher C asks students themselves to recognize what is new and what is old information. Instead of asking questions of the students, Teacher C models the process of asking questions of the text or of oneself and coaches the students in carrying out the modeled process. In writing, Teacher C makes use of external prompts, modeling, and peer cooperation to enable students to carry on their own Socratic dialogues, by means of which their knowledge is not only activated but reconsidered and evaluated in relation to what they are trying to write. Whereas Teacher B tries to minimize students' difficulties in comprehending and composing, Teacher C will sometimes assign reading or writing tasks that present special difficulties in order to provide occasions for teaching problem solving strategies. When difficulties arise they are treated as interesting phenomena for investigation, with the result that the students themselves become students of cognitive processes in reading and writing.

According to recent studies, Teacher A represents how reading comprehension and written composition are commonly handled in the schools (Pearson & Gallagher,

1983; Graves, 1978). Probably everyone would agree that both Teacher B and Teacher C represent significant improvements over this norm. If Teacher A represents what is actually going on, Teacher B probably represents the consensus among educators about what should be going on. The Teacher B model can be found in textbooks on language arts teaching (e.g., Spache & Spache, 1977) and in policy documents aimed at curriculum planners (Anderson et al., 1985; Graves, 1978; Muller, 1967). The Teacher C model, on the other hand, is only beginning to emerge out of experimental instructional studies specifically concerned with the fostering of higher-order competencies (e.g., Palincsar & Brown, 1984; Scardamalia, Bereiter, & Steinbach, 1984).

There are major differences between the approaches of Teacher B and Teacher C. Both approaches are consonant with certain bodies of cognitive research, and both are capable of theoretical justification. But the approaches have different goals. They are not alternative methods of pursuing the same result. In a later section of this paper we shall argue that the Teacher C approach is the only one that offers serious possibilities of putting a high level of literacy within reach of the majority of students.

## Bases for the Three Teacher Models

### Model A as an Exercise Model

It is always easier to identify the basis of an innovation than it is to identify the basis of the status quo. The Teacher A model, representing the status quo, is founded on long-established customs that have often become ritualized to the extent that their point is not consciously entertained by the teachers who practice them (cf. Heap, 1985). We have recently been involved with field-testing reading lessons designed according to Model C. Seasoned educational consultants warned us to expect teachers to complain that there was "no comprehension" in the reading lessons. That is exactly what happened. In actuality there was an enormous amount of intensive work on all aspects of comprehension. Absent, however, were the traditional comprehension

questions and workbook exercises. These curriculum elements, it would appear, have been so constant and universal that they have come to take the place of the educational objectives they were intended to foster.

The Teacher A model is institutionalized in the popular basal reading programs that have dominated North American education. Although it would be simplistic to suggest that these programs created the Teacher A model, there can be little question that they serve to propagate it (Durkin, 1981). It is therefore worth looking at how these programs conceive of higher-order competencies in reading and writing.

In the scope and sequence chart of a popular basal reading series, the following constitute the high-order skills purportedly taught up through sixth grade: identifying picture details, story details, supporting details, main ideas, and referents; sequencing; drawing conclusions; predicting outcomes; inferring causes and effects; and making comparisons. The interesting thing is that there is abundant evidence that every normal child entering school can already do all of these things (Donaldson, 1978, Gelman, 1978). A child could hardly carry on a conversation if this were not the case. Consequently, none of them needs to be taught--which is fortunate, since the program offers no clue as to how any of them might be taught to a child who happened to lack one of them. Although the basal programs, and teachers themselves, often speak of "teaching" these competencies, what they in fact refer to almost exclusively is exercising them (Durkin, 1979). Whether such exercise does any good at all is highly doubtful. (See Arter & Jenkins, 1979, for a devastating review of modern efforts to treat learning difficulties by prescribed mental exercise and Bereiter & Bird, 1985, for negative evidence related specifically to comprehension question-answering exercises.) Certainly it is the case that if mere exercise of basic intellectual processes were sufficient, high literacy would already be the norm.

Model B as a Knowledge-Base Model

Teacher B is following what we may informally call a knowledge-base approach. Although the model antedates contemporary cognitive research, it draws support from a large body of recent studies demonstrating the crucial role of background knowledge in the mental processing of texts (Pearson, Hansen, & Gordon, 1979; Voss, 1984). The key premises of this approach are (a) that the main determinant of performance in comprehension and composition is the adequacy of relevant world knowledge the student has to draw on, and (b) that such cognitive skills as are required for performance are either already available or will develop naturally under conditions of high available knowledge. From these premises flow the following practical maxims:

The best way to "teach" comprehension is to maximize comprehension; the way to maximize comprehension is to insure that the necessary topical knowledge is available.

The best way to "teach" composition is to maximize the quality of what students write; this is achieved by insuring that students write about what they know and want to express.

In its sophisticated versions, the Teacher B model does not deny that there are cognitive skills and strategies to be acquired. What is argued, rather, is that higher-order skills and strategies are first developed within domains in which the person has ample knowledge, so that knowledge is a necessary and, under favorable circumstances, a sufficient condition for the development of high-order competencies (Chi, 1985; Glaser, 1984). As Glaser (1984) acknowledges, the evidence is not yet in to confirm or disconfirm this argument. Accordingly, we shall not dispute it here. What we will argue, however, is that high literacy involves something beyond subject-matter knowledge and skills in processing verbal information and that for this reason it is not

sufficient to rely on the knowledge base to insure development of high-level competencies.

Model C as an Intentional Learning Model

Although model B has a rationale and a research basis that model A lacks, it is not a radically different model. It is, rather, an enhanced version of model A. Indeed, one might turn around and say that model A is merely a degenerate version of model B, since the recommended methods of teaching reading and writing have resembled model B for generations (see, e.g., Betts, 1946). Model C, on the other hand, differs from the other two in basic respects.

Models A and B are not goal-directed; that is, they do not head anywhere in particular or have an end in view. The reading and writing curriculum, under both models, is pretty much the same in grade 2 as it is in grade 8. The reading selections become harder, the writing assignments may become a little more formidable, but what is done in the course of reading and writing remains the same. The models, thus, presume general improvement through sustained beneficial activities. The differences between models lie in the selection, context, and structuring of those activities. Model C, on the other hand, has a direction, so that in succeeding years the nature of activities carried out by students should evolve. The goal, as we indicated in describing the model, is for the students gradually to take over all the goal-setting, context-creating, motivational, strategic, analytical, and inferential actions that were originally carried out by the teacher and that continue to be carried out by the teacher under models A and B. For Model C there is an end in view. Once students have reached the point of carrying out all the higher-level cognitive functions for themselves, the curriculum sequence has achieved its purpose and can end. (There can, of course, be more advanced curricula--in literary criticism and rhetoric, for instance--that set more advanced goals; here we are really talking only about the core

literacy program in elementary and secondary schools.)

Studies of university and college students provide perhaps the most striking evidence concerning the need for the kinds of teaching represented by the Teacher C model. Enormous variations in higher-order literate competencies can be found within such populations of students, all of whom have completed secondary education with some degree of success and with sufficient academic motivation to pursue higher education (Biggs, 1979; Marton & Saljo, 1976a, 1976b). These differences suggest not simply that many students are not learning to read and write very well. They suggest that many students are not learning how to manage themselves and their development as readers, writers, and learners. When school practices are analyzed from the standpoint of generating independence versus generating dependency on the teacher to manage cognitive activity, models A and B begin to appear seriously disposed toward perpetuating dependency (Bereiter & Scardamalia, 1985a, 1985b).

## Cognitive Requirements of High Literacy

Although one does not find educators openly declaring that high literacy is unattainable by the masses, prevailing practice suggests that this is the implicit belief. The simplification of textbooks and the minimization of text in favor of pictures (Chall, 1977) and the rejection of classic themes in favor of commonplace experience (Egan, 1979) all bespeak diminished expectations of children's educability. Curriculum elements associated with the high literacy tradition are typically reserved for the gifted. The occasional exceptions are newsworthy and often viewed with skepticism--for instance, the Westside Preparatory School founded by Marva Collins (Collins & Tamarkin, 1982), which provides a classical high-literacy curriculum for ghetto youngsters. A high-literacy curriculum, it seems to be thought, requires either a selective system that admits only exceptional children or else teachers who are miracle-workers.

Such a pessimistic view is natural, however, so long as there is no way to distinguish essential from nonessential curriculum elements. If such a distinction cannot be made, then the only route to high literacy is to copy holus-bolus the classical curricula developed for elite schools; and when this is done it should not be surprising to find that large numbers of children will have trouble accommodating to the curriculum.

One aspect of any literacy curriculum, for instance, is the choice of reading material. High-literacy curricula have been distinguished by their use of literary classics. But the use of classics involves a variety of problems--their difficulty, their remoteness from students' experience, their occasional offensiveness to modern sensibilities, not to mention the problem of making some principled selection from among the wealth of possibilities. What is essential and what is nonessential in the choice of reading material for high-literacy curricula? One position would be that what is essential is just the importance of the works in the history of one culture (cf. Hirsch, 1983). But a more fundamental analysis examines how different types of literature relate to the students' developing capacity for understanding (Egan, 1979). Such an analysis opens possibilities of selecting literature that will perform the functions of the standard classical selections while being more accessible to contemporary children.

A similar kind of getting to the essentials is required as regards the intellectual skills involved in high literacy. It is tempting to equate the high literacy tradition with the teaching of higher-order cognitive skills. To be sure, a concern with the cultivation of intelligence is evident in classical education, from Plato through the early Jesuits and on to such contemporary classical humanists as Jacques Barzun. But it would be stretching the concept of teaching to say that such revered traits as reasoning and judgment were actually taught. A more accurate characterization of the

high literacy tradition would be that it presupposes high-order cognitive skills. Students have been expected to read the works of the greatest writers and thinkers, and their own writing has been expected to reflect in some measure the qualities found in those works. But the cognitive resources necessary for doing this have not been identified; much less have means been sought for developing them in students who did not already have them. Thus it is no wonder that coming from a literate background has been an important preliminary to acquiring high literacy oneself.

A somewhat more cognitive slant on the nature of high literacy has come from cultural and historical studies of oral versus literate modes of thought (Goody, 1977; Olson, 1977). Early formulations of this distinction suggested that the alphabetic medium itself promoted a more abstract, logically constrained kind of thinking (e.g., Goody & Watt, 1963; Havelock, 1963). Subsequent cross-cultural research indicated, however, that possession of a writing system was not sufficient to produce the cognitive differences associated with literacy (Scribner & Cole, 1981). Indeed, there have been strong indications that even university students from low-literacy backgrounds exhibit mainly oral rather than literate modes of thought (Farrell, 1983). In cognitive terms, the essence of the literate mode of thought appears to be the ability to carry out mental operations on text propositions and their relationships. Literate thinkers do not differ from "oral" ones in the mental operations they employ, but rather in what they are able to apply those operations to. The literate thinker is able, on the basis of text information, to construct a mental model of a situation indicated by the text and then derive implications from that model (Johnson-Laird, 1983). The oral thinker (or, as we might say, the "low literate" thinker) is similarly able to derive implications from mental models, but they are mental models based on concrete situations rather than text propositions. Another way of putting this is that for the literate thinker thought is disembedded from its concrete or practical contexts (Donaldson, 1978) and can therefore deal effectively with the full range of imaginable

states of the world.

Such characterizations of the nature of literacy, however, remain vague about just what there is in it that might be teachable. Having identified his students as predominately oral thinkers, Farrell (1983) decided that the way to move them into a literate mode of thought was to teach them standard English grammar. Not a very promising enterprise, given the history of earlier efforts to educe some benefit from grammar study (Petrovsky, 1977)-- but it is not at all clear from the research on oral versus literate modes of thought what, other than long-term cultural immersion, would constitute a promising way of getting people from one mode of thought to the other.

A different way of looking at the intellectual underpinnings of high literacy is the method of expert-novice comparisons popular in cognitive research. This method is promising because it does not simply look at what kinds of performance or background variables distinguish experts from novices. It looks at what experts know and at what they do that novices do not do or do differently or do less often. Thus there is often a fairly direct link between discovered differences and possible instructional goals. Expert-novice distinctions, it should be noted, are relative. Sometimes the comparison is between bona fide experts and amateurs, but other times (and this is often the case in research on reading and writing) it is between any two groups that differ notably in competence--for instance, a difference between 10-year-olds and 18-year-olds or between failing students and successful students. Regardless of the comparison groups, certain higher-order skills and strategies emerge as consistently distinguishing the more from the less competent readers and writers. These skills and strategies fall into four types:

1. Problem-solving, fix-up, or back-up strategies. One of the striking findings of "knowledge-base" research is that experts working within their domains do far less

problem solving than outsiders might suppose. This is because they have a large repertoire of abstract problem types and ready-made solutions, so that much of what would require problem solving by the nonexpert can be handled as routine application of knowledge by the expert (Lesgold, 1984). Experts do occasionally run into problems, however, and it would represent a strange gap in human intelligence if they did not have strategies for dealing with them. This proves to be true of expert readers and writers. Bird (Bereiter & Bird, 1985) recorded capable adults thinking aloud while they read various texts, and later analyzed their protocols in search of strategies they employed when they ran into comprehension difficulties. Four strategies identified the more capable readers--restating the text in simpler or more familiar terms, backtracking to the site of needed information, setting up "watchers" for needed relational information, and formulating comprehension difficulties as problems to be solved. Seventh- and eighth-graders who were taught these strategies by a combination of direct instruction and thinking-aloud modeling increased significantly in their use of three of the strategies (all but setting up "watchers"). They also gained substantially and significantly in reading comprehension over other groups, including a group that was given a Teacher A model question-and-answer approach to comprehension instruction.

2. Self-regulatory procedures. Examples of these procedures are checking, planning, monitoring, testing, revising, and evaluating (Brown, 1978; Brown & Campione, 1981). These are not procedures for solving problems but are "good mental housekeeping" procedures that tend to avert problems or lead to their being recognized if they arise. Much of what has traditionally been dealt with under the rubric of study skills falls in this category. Experts have been distinguished from novices by greater exercise of self-regulatory procedures in both reading (Markman, 1981; Paris, Lipson, & Wixon, 1983) and writing (Flower & Hayes, 1980; Nold, 1981; Scardamalia & Bereiter, 1985c). Self-regulatory procedures are not necessarily independent of

subject-matter knowledge. For instance, Greeno (1982) has identified specific conceptual lacks which prevent students from checking their work effectively in algebra. Nevertheless, there have been successful training experiments that focussed on domain-independent self-regulatory procedures in reading (Palincsar & Brown, 1984), writing (Scardamalia et al., 1984), and study skills (Dansereau, 1985).

3. Executive structures. The skilled orator, in the classic sense, would be distinguished from the ordinary speaker by more than a repertoire of fix-up and self-regulatory procedures. In one way of putting it, for the orator, many more parameters of speaking behavior are under strategic control, meaning that they can be manipulated by the orator to achieve speaking goals. In cognitive science terms, this means that the orator has a much more complex executive control structure for speaking. This is not the same as having conceptual knowledge about the process. Reading a book on rhetoric will not give the novice speaker control over the relevant parameters, although it may lead to knowing what those parameters are. The orator's more complex control structure does more than produce proficiency: It enables the orator to pursue goals (for instance, the goal of communicating one thing literally while implying something else through intonation) that the novice speaker can scarcely conceive of.

Expert-novice studies of writers and readers have indicated comparable differences in executive control structures. In contrasting models of novice and expert composing, the novice control structure is a simple device for retrieving information from memory that fits topic and genre requirements. It is what we have described elsewhere as a "knowledge telling" model (Scardamalia & Bereiter, 1985c, in press). Very little of the process of generating text content is under strategic control, so that goals are unable to play much role in composing. Experts, on the other hand, appear to follow a "knowledge transforming" model, in which there is an interactive solving of

content-related and rhetorical problems in the pursuit of goals to be achieved through the composition. There is evidence that a similar distinction between expert and novice models applies in reading, so that for the expert, reading is a strategically-guided knowledge-constructing process whereas the novice's executive control structure permits little goal-directed knowledge-constructing activity to go on (Brown, Campione, & Day, 1981; Scardamalia & Bereiter, 1984).

Little is presently known about the extent to which instruction can promote the development of more complex executive control structures. Case's developmental theory of instruction (Case, 1978, 1985; Case & Sandieson, in press) has shown great promise as a guide to teaching more complex control structures for specific tasks (such as time-telling or solving ratio problems). It depends on being able to specify a progression of increasingly complex control structures leading, by small increments in complexity, from the control structure currently used by the student to the intended, more expertlike structure. As regards the higher-order aspects of literacy, such control structures are only beginning to be identified, and so it is too early to tell whether an incremental approach like Case's will prove applicable or whether some means of more radical transformation will prove necessary. Procedural facilitation, a strategy of providing external supports for students in the early stages of adopting a new control structure, has shown promise when applied to complex processes such as planning and revision in writing (Scardamalia & Bereiter, 1985a, 1985b, 1985c). Procedural facilitation also relies on explicit models of the control structures to be acquired, however, and so its application is currently limited by the incomplete state of understanding these structures in reading and writing.

4. Intentional learning procedures. In many school activities the student's efforts are directed toward solving a problem, answering a question, enjoying a story, finishing an essay, and so forth. Learning occurs as a by-product, intended by the

teacher but unintentional as far as the student is concerned. But this is not necessarily the case. A nice example is provided by Davis and McNight (1979), who observed that talented young mathematical problem-solvers appeared to pause after solving a problem in order to formulate the generalizable knowledge that could be drawn from the experience. Similar intentional learning was reported by Karmiloff-Smith and Inhelder (1976) among younger children who, along with trying to solve block-balancing problems, appeared to be testing theories about balance.

Intentional learning may be defined as effort invested in learning, over and above the effort devoted to achieving other goals of an activity (Bereiter & Scardamalia, 1985b). In the comments of talented young writers, for instance, one can see evidence that at the same time that they are putting effort into writing something, they are also putting effort into learning to write--to extracting knowledge from the current experience that will help them in future writing (Britton, 1982; Calkins, 1979). More generally, one can see evidence that some students, in addition to meeting the requirements of reading and writing assignments, are pursuing higher-level goals of learning something personally meaningful and generally upgrading their knowledge and understanding through work on the assignments (Scardamalia & Bereiter, 1982).

Students appear to differ dramatically in their dispositions toward intentional learning, but what it might take to foster higher levels of intentional learning is only beginning to be investigated (Bereiter & Scardamalia, 1985b). A number of small experiments suggest that it can be fairly directly promoted in learners ranging from first grade to post-university (Bereiter & Scardamalia, 1985c; Rella, 1985). However, it seems likely that major instructional reforms, representing a shift from Teacher A and B models to model C, may be required in order to produce a climate in which intentional learning can flourish.

## Rising to High Literacy by One's Bootstraps

We have avoided trying to give a precise definition of high literacy. The reason for this is the same reason that one might wish to avoid precise definition of any curriculum area, such as social studies or mathematics. Different people will have different ideas about what belongs in and what belongs out, about what is central and what is peripheral. Furthermore, opinions on these matters ought not to be purely philosophical but should be to some extent malleable under the hammer of results. Thus, we would like to see curriculum designers with different ideas about high literacy go at it. A decade of experimentation would undoubtedly provide a far better basis than we have now for deciding what deserves to be called high literacy.

One way to provisionally stake out the domain of high literacy is to begin by indicating the boundaries of low literacy. Taking the popular basal reading programs as representative of this domain, we could roughly characterize low literacy as comprising the following educational objectives: ability to extract meaning from simple texts, to read popular literature for enjoyment, and to cope with the reading and writing demands of lower middle-class life (forms, directions, news articles, and the like). If some such characterization of low literacy is accepted (the particulars are not important here), then the problem of defining high literacy is the problem of establishing what there is beyond these low-literacy goals that a literacy program ought to aim at.

It is easy to think of a great many things beyond low-literacy goals that are worth aiming at. Indeed, there is a superabundance of candidate goals--goals drawn from literary considerations of what is worth reading, from cultural considerations of what is worth knowing or being familiar with, from political-social considerations of what kinds of literacy would lead to desirable social change, from economic considerations of what kinds of literacy are likely to be in demand in the future, and so on.

The essential thing that these diverse goals have in common is that they represent something beyond the level of literacy that is currently prevalent in the culture. This fact has profound implications for the teachability of high literacy. In the context of mass education, high literacy cannot be conceived as a matter of cultural transmission. That may be how it could be conceived in elite schools--as a matter of transmitting to the young knowledge, skills, standards, and attitudes that are already prevalent in the surrounding adult world. But for mass education, it has to be assumed that for the most part the goals of high literacy are not already represented in the surrounding environment--that they are not embodied in parents or other significant adults in the child's life (perhaps not even in many teachers) nor in the cultural artifacts to which the child is exposed. This means that mass education in high literacy must be thought of, not as cultural transmission, but as cultural upgrading. It is the effort of a culture to lift itself by its bootstraps; and much of that effort will have to be made by the students themselves.

What this means is that merely adaptive learning cannot suffice. The term adaptation is not intended to have any negative connotations of conformity or passivity here. Rather, we take it that most learning in school and out in the world results from efforts to deal with conditions, demands, and constraints in the environment and to achieve personal goals within those circumstances. In this sense one may say that the Inuit are adapted to an Arctic environment by virtue of learning, whereas the polar bear is adapted to the same environment by virtue of biological evolution. In the same sense, one may say that the typical child achieves literacy by adapting to social expectations and to the school requirements of performing word recognition exercises, reading aloud, answering teacher questions, and the like. The child, in short, does not have to try to learn to read but merely has to try to deal with day-to-day situations and school assignments as they appear, and if these are successfully negotiated literacy will automatically ensue. But the literacy that ensues is the literacy sustained and

required by the surrounding environment; and this, we are saying, is low literacy. For the typical child growing up under typical circumstances, high literacy cannot be achieved by such adaptive learning. The surrounding social environment does not expect or require it. Adapting to environmental conditions will not produce it. That, we believe, is the essential idea of high literacy or of high culture in general. It is something beyond what adaptive learning within the prevailing culture will generate or sustain.

It is in this light that we believe the Teacher C model holds out the only hope for success. Teacher A and B models are only suitable to promote adaptive learning. As an exercise model, Teacher model A relies on learning that results from meeting the demands of various assigned tasks. A chancy method at best, we do not see how it can possibly work for achieving goals of high literacy. It does not seem possible to design tasks, the execution of which will generate high literacy. There have been perennial hopes that Latin or formal grammar might provide tasks having this virtue, but evidence has never lent support to these hopes. Perhaps the most realistic hope for a Teacher A approach to high literacy has been the "challenging" writing assignment. The National Council of Teachers of English published a monograph called They Really Taught Us How To Write (Guender, Harvey, Loyd, & Wages, 1978). In it, teachers who had gained recognition for producing talented writers described their methods. Prominent in these descriptions were assignments and activities that forced students to higher levels of thinking about what they were doing. But it is also quite clear that these tasks functioned within a cultural atmosphere of high literacy, fostered by the teacher but probably also supported by other parts of the student's environment. We have carried out a variety of experiments with writing tasks that pose intellectual challenges to students and find that, unless students are especially primed to do otherwise, most of them will manage to reduce any writing task to a routine process of knowledge telling (Bereiter & Scardamalia, 1983).

The Teacher B model does not rely so much on exercise, but it does rely heavily on socialization processes to produce learning. Interpersonal influences, if judiciously managed, may go a considerable distance in promoting comprehensible, interesting, and elaborated writing (Calkins, 1983). But it is important to note that the Teacher B model provides no way to rise above the emergent standards of the social group. Where these standards represent high literacy the Teacher B model is effective, but not where the problem is to rise above intrinsic standards.

It is a bit harder to articulate how the Teacher B model relates to levels of literacy in reading. The implicit assumption of a knowledge-base approach seems to be that literacy will rise to a level commensurate with the knowledge one has to deal with. This is probably true in some sense. What is not clear is how limited that sense is. It is probably true, for instance, that a person whose work involves negotiating sales agreements will--given some basic level of literacy to start with--develop an ability to cope with the idioms and syntax of sales contracts. The literacy thus acquired may even spill over into an enhanced ability to read other sorts of legalistic material. Such results are in keeping with what we have already said about adaptive learning.

But if high literacy implies development beyond what is required for adaptation to environmental conditions, then it is not clear where the knowledge demands would come from that would motivate the progress in literacy. What is to prevent both literacy and knowledge from leveling off at whatever point enables people to get along? We would suggest that, except in the learned professions, this is what generally happens. And the learned professions are exceptions precisely because in them continual deliberate growth in knowledge is a requirement of successful adaptation. This sober-sided view of knowledge growth does not necessarily deny a role to spontaneous curiosity. We might put it this way: Under ordinary (Teacher A or

Teacher B) conditions, people will acquire the level of literacy they need to get along but then will additionally use it to satisfy curiosity. If, however, curiosity develops to the point where it begins to force the development of higher levels of literacy, it has turned into intentional learning. How to bring such a conversion about is a concern of Teacher C but not of Teachers A or B.

Cognitive skills needed to pursue high literacy

In a low-literacy curriculum students have little need of problem-solving, fix-up and back-up strategies because the curriculum is so contrived as to present few reading and writing challenges. Especially where the Teacher B model is in effect, teachers try to head off problems before they arise, by prereading and prewriting activities. A more demanding curriculum, whether it involves more difficult material or higher goals for what is to be done with the material, is sure to confront students with problems. If real cultural upgrading is to be achieved, then students must confront these problems, not devise coping strategies that allow them to circumvent the problems while preserving their cognitive structures intact (Scardamalia & Bereiter, 1982; in press).

Self-regulatory procedures become increasingly important whenever students need to rely more on their own resources in learning. A high-literacy curriculum would not necessarily appear on the surface to require more self-reliance in learning than a low-literacy curriculum. A conventional classroom observation study might show a similar amount of teacher direction. But it seems reasonable to suppose that in any high-literacy curriculum more of what is to be learned would have to come from texts and from students interactions with texts (including those they write themselves) rather than from the teacher's direct instruction or from exercise routines. In that case, students' command of checking, planning, monitoring, testing, and revising procedures would become crucial. Particularly important are students' procedures for

monitoring their own level of comprehension (Markman, 1981), for unless students can recognize comprehension difficulties, they have no way to apply the problem-solving and back-up strategies referred to in the preceding paragraph.

Sophisticated executive structures for reading and writing are perhaps better thought of as potential outcomes of a high-literacy curriculum rather than as requirements of one. But unless direct attention is given to executive control structures, there is a danger that, in order to deal with immediate curricular demands, students will develop coping strategies that subvert educational objectives (Holt, 1964) and block development of the more expertlike control structures (Bereiter & Scardamalia, 1985a).

All of these cognitive requirements subserve the more general requirement that students in a high-literacy curriculum be able to function as intentional learners. This means that they must be able to formulate and pursue learning agendas of their own that are not simply responses to day-to-day demands of the curriculum. Without that, it is hard to see how literacy can ever rise above the standard of the cultural milieu. The Abraham Lincoln-type stories of people from disadvantaged backgrounds rising to high literacy are all stories of intentional learners. (The movie, Educating Rita, is a delightful contemporary treatment of this romantic theme.) Given that only a minority of students spontaneously emerge as intentional learners, however, schooling has to be geared to helping them become so. That is why the Teacher C model appears indispensible: it is the only model in which intentional learning is an objective rather than a presupposition.

## Can the Teacher C Model be Realized?

The goal of developing independence in learners is, of course, not new. It is, in fact, a standard part of the ideal image of teachers. Thus teachers whose actual behavior more closely fits models A or B are likely nevertheless to entertain the ideals

of Teacher C. The point we have been trying to make is that, regardless of ideals, models A and B contain no actual means or provisions for promoting the kind of learning needed for the bootstrapping of high literacy. Teachers who have been successful in fostering the development of children into intentional learners have, we would argue, been acting according to some version of model C. The remaining question, however, is whether model C can actually be put into practice by design and whether it can function to achieve its goals.

Evidence on this question is partial and only suggestive. Although the ideal of fostering intentional learning may be an old one, it is only recently that research on active learning strategies has begun to provide a basis for explicit development of the Teacher C model. Of the four cognitive components of high literacy that we have been discussing, there is evidence that the first two, at least, are teachable. Problem-solving strategies and self-regulatory procedures for the improvement of reading comprehension difficulties have been successfully taught through combinations of direct instruction and modeling of thinking processes (Bereiter & Bird, 1985; Roehler & Duffy, 1984). Teaching strategies that begin with teacher modeling and that gradually turn more of the executive control over to children have been shown to be effective in both comprehension (Palincsar & Brown, 1984) and in composition planning (Scardamalia et al., 1984). Global changes in executive structures remain to be demonstrated, however. As to the direct promotion of intentional learning, there are a number of case studies and small experiments with positive results (summarized in Bereiter & Scardamalia, 1985c). For instance, Rella (1985) was able to teach first-graders to distinguish between "easy" ideas and "thinking" ideas evoked by texts, as a result of which the children showed a significant increase in the incidence of the more effortful and complex "thinking" ideas.

Considering the recency of the research focus, there is no shortage of results

supporting the promise of a Teacher C approach to teaching literacy skills. What remains far from evident, however, is the sufficiency of what has been shown to be possible. Would a combination of the methods found to promote higher-order skills in reading and writing be sufficient to bring about high literacy in students who lack cultural supports for it? The answer is probably no, not yet.

For the sort of intentional learning that high literacy would seem to require, something more than cognitive skill is involved. There is a motivational aspect as well, a willingness to invest effort in learning, over and above the effort required for success in the tasks at hand. Thus the motivation involved in intentional learning is different from achievement motivation. It is not simply motivation to do well, but is motivation directed toward cognitive goals that lie beyond immediate performance (Biggs, 1984). Such motivation becomes problematic when the learning goals are obscure, and this is sure to be the case in any effort to promote high-literacy.

The predicament comes to this: How are students to pursue goals of high literacy when they have no way of knowing in advance what high literacy is? The great advantage held by children growing up in highly literate environments is that they have some sense of what there is to strive for and of what value might come from attaining it. For children not thus favored, the only way we can see out of the predicament is to provide the necessary supportive cultural environment within the school itself. But it is unrealistic to suppose that this school environment could itself be an environment of high literacy. To prescribe such a high-literacy environment (as is often done in utopian educational proposals) is to imagine that what is so difficult to foster in children can be created in school staffs at the wave of a wand.

The supportive school environment must be one that can be achieved without presupposing the very condition that it is intended to bring about. The best model we can think of for this is the model of the learned professions. As we noted previously,

the learned professions stand as an exception to the rule that learning levels off at the point of adaptation to environmental requirements. This is because in the learned professions (and in some other occupations of high expertise) adaptation to the expectations of one's peers requires continual growth in knowledge and competence. If this argument sounds circular it is because the process being described is an iterative or self-feeding one. What the professional milieu supports is not a particular level of knowledge but rather a process of continually going beyond where one is. That is how professions and disciplines themselves manage to keep progressing rather than stabilizing around a fixed body of knowledge and procedures. But the progress, both at the individual and at the group level, is not simply a matter of coming up to the level of something that already exists.

Accordingly, we can imagine a school environment that functions like a learned profession, to which teacher and students alike belong. What is supported in this environment is continual growth in literacy--that is, growth beyond wherever one happens to be. A vital part of this idea has already been put into practice through one of the most successful efforts to upgrade literacy, the Bay Area Writing Project (Gray & Myers, 1978). The part captured by that project is getting the teacher to function as a learner with respect to writing. Note that this is quite fundamentally different from the more commonplace notion that the teacher of writing must be a good writer. Many teachers might be unable to meet that requirement. But the requirement that the teacher be able to function as a good learner of writing seems, to judge from the experience of the Bay Area project and its offshoots, to be within the capabilities of the majority. To complete the picture, we would need teachers functioning as learners of reading and as strivers after higher levels of literacy than they currently possess (there being, of course, no ceiling in these things). We would also, however, need teachers teaching, and in particular teaching the higher-order cognitive skills that will enable children to adapt to a school culture in which intentional learning is the

norm. And finally, we would need teachers able to enlist children in the mutual support of one another's learning efforts--in other words, to foster a kind of professionalism among the students.

This enriched version of model C is idealistic and no doubt very difficult to achieve. Yet before it is dismissed as one more utopian notion, two points should be considered. First, although it involves a radical change in approach to teaching, it does not presuppose knowledge or skills far beyond those already exhibited by teachers. Second, if it is true that fostering high literacy involves a kind of bootstrapping or cultural upgrading, the difficulty and cost are sure to be high. Contemporary cognitive research holds out no promise of making the task easy. What we have tried to show is that it does hold promise of making the task possible.

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